UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW HAMPSHIRE

Markem-Imaje Corp.

v.

Civil No. 10-cv-112-PB
Opinion No. 2011 DNH 194

Zipher Ltd. &
Videojet Technologies, Inc.

MEMORANDUM AND ORDER

Markem-Imaje Corporation ("Markem"), a manufacturer of thermal transfer printers, seeks a declaratory judgment that a series of patents assigned to Zipher Ltd. ("Zipher") are invalid, unenforceable, and have not been infringed by Markem or its customers. In this Memorandum and Order, I construe the relevant patent terms.

I. BACKGROUND

A. Overview[1]

This dispute involves the tape drive systems used in

[1] The description of thermal transfer printers is drawn from a prior order I issued construing the terms of the U.S. Patent No. 7,150,572 (filed Dec. 19, 2006). See Markem-Imaje Corp. v. Zipher Ltd., No. 07-cv-06-PB, 2008 WL 4116666 (D.N.H. Aug. 28, 2008).

industrial thermal transfer printers. Product manufacturers use these printers to rapidly print unique information onto individual labels or packaging material. For example, a potato chip manufacturer might use a thermal transfer printer to stamp expiration dates onto a roll of flat potato chip packages before separating the roll into individual bags and filling the bags with potato chips.

The act of thermal transfer printing consists of pressing a print head against an inked tape that contacts the printing medium (the potato chip bag) and then using the print head to selectively heat the tape, thereby transferring the desired ink pattern to the printing medium (e.g., "BEST IF USED BY 07.01.2011"). The basic principle is similar to that of a typewriter or dot matrix printer, except that the print head uses heat rather than the force of the impact to transfer the ink from the ribbon to the printing medium.

As with any industrial application, reliability is extremely important in a thermal transfer printer. Some of the failures that can interrupt the operation of such a printer include excessive tape tension (which can cause the tape to break, forcing the operator to halt the production line to

respool the tape), insufficient tape tension (which can interfere with the printer's ability to position the tape properly), wastage of unused tape (which forces the operator to replace the tape spools more frequently), and mechanical failures caused by wear and tear on the tape drive system. Accordingly, tape drives must be designed to maintain tape tension within an appropriate range.

For two reasons, simply rotating each spool the same number of degrees for each printing cycle will not produce consistent tape tension. First, even in perfect conditions, rotating a given spool by a given number of degrees will result in a different length of ribbon advance depending on the diameter of ribbon on the spool. For example, a one-degree rotation of a spool 100 mm in diameter will result in about 0.9 mm of ribbon advance, whereas a one-degree rotation of a spool 50 mm in diameter will result in only about 0.4 mm of ribbon advance. Thus, the rotation of each spool must be adjusted according to the amount of ribbon remaining on the spool. Second, real-world conditions can interfere with the ideal mathematical relationship between spool diameter, spool rotation, and ribbon advance. For example, ribbon may stretch unevenly over time,

causing unpredicted slack to develop. Additionally, if the ribbon breaks, operators may take actions (such as taping two sections of ribbon together or tying off the ribbon) that make it even more difficult to measure how much ribbon remains on each spool.

B. Prior Litigation

Between 2007 and 2010 these same parties engaged in litigation over U.S. Patent No. 7,150,572 (filed Dec. 19, 2006) ("the '572 Patent"). In a series orders I construed the terms "drive" and "spools" as they were used the '572 Patent. See Markem-Imaje Corp. v. Zipher Ltd., No. 07-cv-06-PB, 2008 WL 4116666 (D.N.H. Aug. 28, 2008); Markem-Imaje Corp. v. Zipher Ltd., No. 07-cv-06-PB, 2009 WL 2855011 (D.N.H. Sept. 1, 2009). I construed the term "drive" to mean "rotates" and the term "spools" to mean "more than one spool." Based on these rulings, I held that Markem's printer did not literally infringe the '572 Patent. On appeal, the Federal Circuit vacated my rulings and held that "drive is properly construed to mean the application of torque to the spools, whether the torque causes rotation or resists it . . . ." Markem-Imaje Corp. v. Zipher Ltd., 657 F.3d 1293, 1301 (Fed. Cir. 2011).

The present dispute concerns four continuation patents obtained by Zipher following my rulings with respect to the '572 Patent. The four patents at issue in this case are: Patent No. 7,682,094 (filed Sep. 21, 2006) ("the '094 Patent"), Patent No. 7,748,917 (filed Mar. 16, 2007) ("the '917 Patent"), Patent No. 7,722,268 (filed Mar. 21, 2008) ("the '268 Patent"), and Patent No. 7,753,605 (filed Mar. 11, 2009) ("the '605 Patent").[2] Although the subsequent patents' claims differ from the '572 Patent, each patent's specification is necessarily the same as the specification filed with the '572 Patent.

C. The Asserted Patents

The patents at issue in this case disclose a tape drive intended for use in a thermal transfer printer.

The tape drive described in the common specification consists of two spools of tape, each mounted on a spool support. See '094 Patent, fig. 1. The spools of tape are each controlled by a stepper motor.[3] See id. A controller is connected to the stepper motors, and controls the energization of the stepper

[2] Where generic references are appropriate, I will generally refer to the '094 Patent.

[3] A stepper motor is a special type of motor that allows for small rotational steps.

motors. See id. col. 4, ll. 26-27. The controller energizes the stepper motors to drive the tape spools in the direction of the tape transport. During tape transport "[t]he stepper motors operate in push-pull bi-directional mode."[4] In the "push-pull" mode, both motors drive their respective spool of tape in the direction of the tape transport. Id. col. 18, ll. 20-23. Because both motors contribute to the tape transport, it is possible to provide high rates of acceleration and deceleration to quickly position the tape for the next printing operation. Id. col. 4, ll. 31-35.

Tension in the ribbon between the spools is maintained by adding or subtracting an amount of tape to or from the tape extending between the spools. Id. col. 21, ll. 56-62. If the tension falls outside an acceptable tolerance, the controller determines a correction amount of tape to be added or subtracted from the tape extending between the spools. Id. col. 22, ll. 10-12. Then a "small step adjustment can be made to either or

[4] The most common form of prior art relied on a single motor to drive the tape-up spool, while tension control was provided by a "slipping clutch" arrangement on the supply spool. As the take-up motor would pull tape from the supply spool, the slipping clutch would provide a resistive force that maintained an appropriate level of tension in the tape.

both of the motors to add a short section . . . [or remove a short section of ribbon] from the length of ribbon between the spools." Id. col. 21, ll. 57-62. "This addition or removal of ribbon maintains ribbon tension within acceptable limits." Id. col. 22, ll. 13-14.

II. ANALYSIS

The parties present two types of claim construction problems. First, they disagree as to whether various claims that use the terms "controller" or "monitor" should be construed as "means-plus-function claims" under 35 U.S.C. § 112, ¶ 6. Their remaining disagreements focus on the construction of three claim terms.[5]

A. Means-Plus-Function Claims

Section 112, ¶ 6, which was enacted in response to the Supreme Court's prohibition against the use of functional claiming in Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1 (1946) allows an inventor to express an element of a claim "as a means or step for performing a specified function

[5] Markem also argues that two other terms are "insolvably ambiguous" under 35 U.S.C. § 112, ¶ 2. I decline to address that argument in the current Memorandum and Order.

without the recital of structure, material, or acts in support thereof . . . ." 35 U.S.C. § 112. In exchange for the convenience of means-plus-function claiming, a claim written in such terms is restricted to the "corresponding structure, material, or acts described in the specification and equivalents thereof." Id.

Under the analytical framework adopted by the Federal Circuit, a claim element that uses the terms "means" or "step" triggers a rebuttable presumption that § 112, ¶ 6 applies. Inventio AG v. ThyssenKrupp Elevator Ams. Corp., No. 2010-1525, 2011 WL 2342744, at *5 (Fed. Cir. June 15, 2011). Conversely, when a claim does not use these terms, one presumes that it is not subject to § 112, ¶6. However, "a limitation lacking the term 'means' may overcome the presumption against means-plus-function treatment if it is shown that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function." Mass. Inst. of Tech. v. Abacus Software, 462 F.3d 1344, 1353 (Fed. Cir. 2006) (internal quotation marks omitted).

Despite this caveat, the Federal Circuit does not require a claim term to denote a specific structure in order to avoid

application of § 112, ¶ 6. See id. At 1356; Lighting World, Inc. v. Birchwood Lighting, Inc., 382 F.3d 1354, 1359 (Fed. Cir. 2004). Instead, it is sufficient if the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, "even if the term covers a broad class of structures and even if the term identifies the structures by their function." Mass Inst. of Tech., 462 F.3d at 1356 (quoting Lighting World, 382 F.3d at 1359-60). As a result, the Federal Circuit has "seldom held that a limitation not using the term 'means' must be considered to be in means-plus-function form . . . [and] the circumstances must be [unusual] to overcome the presumption. . . ." Lighting World, 382 F.3d at 1362; see, e.g., Inventio AG, 2011 WL 2342744, at *7, *9 ("modernizing device" and "computing unit" connoted sufficient structure); Mass. Inst. of Tech., 462 F.3d 1355 ("aesthetic correction circuitry" amounted to a sufficient structure); Lighting World, 382 F.3d 1363 ("connector assembly" denoted sufficient structure); CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1369 (Fed. Cir. 2002) ("reciprocating member" connoted sufficient structure); Personalized Media Commc'ns, LLC v. Int'l Trade Comm'n, 161 F.3d 696, 704 (Fed. Cir. 1998) ("digital

detector" connoted sufficient structure).

Markem asserts that six of the disputed claims employ means-plus-function claiming even though they do not employ the terms "means" or "step."[6] Its argument is that claims are subject to § 112, ¶ 6 because they use the undefined terms "controller" and "monitor" without denoting sufficient structure to perform all the requisite functions identified in the patents' claims. I disagree.

While the terms "controller" and "monitor" undoubtedly cover a class of structures, they are understood by persons of skill in the art as structures, and do not amount to "nonce words" or "verbal constructs" that are simply substitutes for the term "means for."[7] See Mass. Inst. of Tech, 462 F.3d at

[6] The claims that are covered by this argument are: claim 2 of the '094 patent, claim 18 of the '094 patent, claim 1 of the '268 patent, claim 1 of the '605 patent, and claim 12 of the '605 patent.

[7] Markem equates the term "controller" with a "general purpose computer," and notes that a specification's disclosure of a "general purpose computer" is insufficient when a party utilizes means-plus-function claiming. See Aristocrat Techs. Australia Pty Ltd. V. Int'l Game Tech., 521 F.3d 1328, 1333 (Fed. Cir. 2008). This analogy is misplaced. The structural disclosure required in the specification when a party chooses to employ means-plus-function claiming is not the same structural disclosure required to avoid means-plus-function treatment. See Mass. Inst. of Tech., 462 F.3d at 1356. In any event, I do not

1356.

Dictionary definitions confirm my conclusion.[8] See Lighting World, 382 F.3d at 1360 ("[W]e have looked to the dictionary to determine if a disputed term has achieved recognition as a noun denoting structure, even if the noun is derived from the function performed."); Goss Int'l Ams., Inc. v. Graphic Mgmt., 739 F.2d 1089, 1100 (N.D. Ill. 2010). "Controller" is defined by the IEEE as "a device or group of devices used to control in a predetermined manner the electric power delivered to the apparatus to which it is connected" and "the entity that enforces the desired behavior – as specified by the control objectives – of the controlled process by adjusting the manual inputs." IEEE Standard Dictionary of Electric and Electronic

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consider a controller to be a "general purpose computer." See Goss Int'l Ams., Inc. v. Graphic Mgmt. Assocs., Inc., 739 F.Supp.2d 1089, 1100 (N.D. Ill. 2010) (identifying controller as a special purpose computer).

[8] Other courts interpreting the term "controller" have similarly found that it connotes sufficient structure. See e.g., Goss Int'l Ams., Inc., 739 F.Supp.2, 1100 (N.D.Ill. 2010) (noting that "a controller is a known structure that is a type of special purpose computer"); 911EP v. Whelen Eng'g Co., Inc., 512 F.Supp.2d 713, 723-24 (E.D. Tex. 2007); Toshiba Corp. v. Lexar Media, Inc., No. C-02-5273-MJJ, 2005 WL 6217120, *26 (N.D. Cal. Jan. 24, 2005); DataTreasury Corp. v. Ingenico S.A., Nos. 5:02CV95, 5:02CV124, 5:03CV39, 2003 WL 25832277, *21 (E.D. Tex. Aug. 19, 2003).

Terms 234 (7th ed. 2000). Similarly, the "monitor" disclosed in the patents at issue matches the structure the IEEE identifies as a "device that observes and records selected activities with a computer system for analysis."[9] Id. at 707. As these definitions illustrate, both "controller" and monitor," while denoting a class of structures, are understood as structural by persons of ordinary skill in the art.

How a term is used in the claims and written description also sheds light on whether it denotes sufficient structure to avoid the application of § 112, ¶ 6. See Inventio AG, 2011 WL 2342744, at *6-8. By detailing the processing that the "controller" and "monitor" perform, delineating the components they are connected to, and explaining how they interact with those components, the claims and written description of the patents at issue establish that the terms "controller" and "monitor" denote sufficient structure to avoid the application

[9] The prosecution history of the '238 patent further supports Zipher's argument that monitor is used in the patents at issue as a structural term. In an "Interview Summary" dated February 25, 2010, the examiner of the '268 patent opined that the patent was "missing structure[]" and suggested adding the term "monitor" to buttress the claim. See Zipher's Opening Br. on Claim Construction, Ex. O at 4, Doc. No. 40-13.

of § 112, ¶ 6. See Inventio AG, 2011 WL 2342744, at *8. Claims 3 and 4 of the '094 Patent describe the composition of the tape deck and detail how the tape deck is comprised of a "monitor operatively connected to the controller for monitoring electrical voltage supplied to at least one of the motors . . ." '094 Patent, col. 28, ll. 52-55; see '094 Patent, fig. 1 (depicting the tape deck and its internal components including the controller). Claims 1 and 2 of the '094 Patent describe the operation of the controller, and its relationship with the other components of the tape deck. Specifically, claims 1 and 2 describe how the controller "control[s] energization of [the] two motors such that the tape is transported, . . . energiz[es] both [] motors so that each motor rotates its respective spool, . . . monitor[s] tension in the tape, . . . and [] control[s] the operation of said two motors to maintain the monitored tension at an acceptable level." '094 Patent, col. 28, ll. 27-50. This contextual use of the terms "controller" and "monitor" in the claims and the written description suggest that they are known physical apparatuses which comprise the tape deck as opposed to purely "verbal constructs." See Inventio AG, 2011 WL 2342744, at *8-*9; Phillips v. AWH Corp., 415 F.3d 1303, 1311

(Fed. Cir. 2005).

In summary, Markem has not overcome the presumption that the terms "connector" and "monitor" are structural terms that are understood by persons of ordinary skill in the art. See Lighting World, 382 F.3d at 1361.

B. Claim Construction

The parties dispute the meaning of three terms. These terms are: "correction amount of tape to be added to or subtracted from tape extending between the spools," "controlling the operation of said two motors," and "parameter indicative of."

"[T]he claims of a patent define the invention to which the patentee is entitled the right to exclude." Phillips, 415 F.3d at 1312 (quoting Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc., 381 F.3d 1111, 1115 (Fed. Cir. 2004)). As a result, "a claim construction analysis must begin and remain centered on the claim language itself, for it is the language the patentee has chosen to 'particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.'" Innova/Pure Water, 381 F.3d at 1116 (internal citation omitted). The words of a patent claim "are

generally given their ordinary and customary meaning." Phillips, 415 F.3d at 1312 (internal quotation marks and citation omitted). The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. . . ." Id. at 1313. To ascertain this meaning, courts naturally look at how the term is used in the asserted claim. See id. at 1314. The other claims of the patent in question "can also be valuable sources of enlightenment as to the meaning of a claim term." Id. "Because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims." Id.

"The claims, of course, do not stand alone. Rather, they are part of 'a fully integrated written instrument[]. . . .'" Id. at 1315 (quoting Markman v. Westview Instruments, Inc., 52 F.3d 967, 978 (Fed. Cir. 1995)). "For that reason, claims 'must be read in view of the specification.'" Id. The specification "is always highly relevant to the claim construction analysis" and is usually "the single best guide to the meaning of a disputed term." Id. (quoting Vitronics Corp. V. Conceptronic,

Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The prosecution history should also be consulted to clarify how the patentee understood the invention and its limitations. See id. at 1317. Finally, extrinsic evidence such as dictionaries, treatises, and expert testimony are useful when "considered in the context of the intrinsic evidence." See id. at 1319.

1. "Correction amount of tape . . ."

The first claim term that the parties have asked me to construe is the phrase "correction amount of tape to be added to or subtracted from tape extending between the tape spools." See, e.g., '094 Patent, col. 31, ll. 49-51. Markem argues that the phrase means "a calculated length of tape that, when added or subtracted to the tape extending between the spools, will restore tape tension to the 'acceptable level.'" Zipher contends that the phrase means "an amount of tape, including a linear length of tape, or the tape associated with one or more steps of a stepper motor." Embedded within these different constructions are three discrete disputes. Markem maintains that "correction amount" is (1) a calculated, (2) linear length of tape, which (3) must restore the tension in the ribbon to an acceptable level. Zipher contends that the term "correction

amount" (1) need not be calculated, (2) includes "the tape associated with one or more steps of a stepper motor," and (3) only intends to restore the tension an acceptable level, but need not necessarily do so.

a. A Calculated Amount of Tape

The parties disagree over whether the "correction amount of tape" is a "calculated amount." Markem argues that the correction amount of tape must be calculated, whereas Zipher contends that the correction amount of tape may be determined through alternative means. I agree with Zipher that the "correction amount of tape" need not be a calculated amount.

The disputed phrase, "correction amount of tape," is used in claim 18 of the '094 Patent, claim 1 of the '268 Patent, and claim 1 of the '917 Patent. These claims recite how the controller determines "an amount of tape" or "a correction amount of tape to be added to or subtracted from tape extending between the tape spools . . ." '094 Patent, col. 31, ll. 49-51. None of the claims at issue expressly require the correction amount of tape to be calculated. See Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 905 (Fed. Cir. 2004). Instead, claim 1 of the '917 Patent simply specifies how the controller

controls "[t]he operation of the motors to add an amount of tape to the tape extending between said spools." Nothing in the language of the claims indicates that the correction amount of tape must be calculated before it is added or subtracted from the spools. Additionally, claim 18 of the '094 Patent and claim 1 of the '268 Patent recite how the controller "determine[s] a correction amount of tape." The term "determines" is broader than "calculates" as it could encompass instances in which the amount of tape is derived through alternative methods such as the use of a "look up table" that do not require a calculation.

The dependent claims further support Zipher's contention that the "correction amount of tape" need not be determined through calculation. See Philips, 415 F.3d at 1314 (noting that other claims "can also be valuable sources of enlightenment as to the meaning of a claim term"). Dependent claim 30 of the '094 Patent claims "the tape drive of claim 18 wherein the controller determines the correction amount of tape at least in part by performing look-up table operations." '094 Patent, col. 32, ll. 37-39. The language of dependent claim 30 is broad enough to encompass circumstances in which the correction amount of tape is determined *solely* through the performance of look-up

table operations. Where dependent claim 30 contemplates the determination of a "correction amount of tape" wholly through reference to a look-up table, I cannot logically require the independent claim on which it depends to require calculation. See Wright Med. Tech., Inc. V. Osteonics Corp., 122 F.3d 1440, 1445 (Fed. Cir. 1997) ("[W]e must not interpret an independent claim in a way that is inconsistent with a claim which depends from it."); Philips, 415 F.3d at 1314 ("Because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims.").

Moreover, the doctrine of claim differentiation suggests that the "correction amount of tape" is not calculated in every instance. See Phillips, 415 F.3d at 1324-25; Liebel-Flarsheim, 358 F.3d at 910. Under the doctrine of claim differentiation, "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." Phillips, 415 F.3d at 1315. The presumption is at its strongest "where the limitation that is sought to be 'read into' an independent claim already appears in a dependent claim. . . ." Liebel-

Flarsheim, 358 F.3d at 910. Claim 30 of the '094 Patent, which depends on claim 18, claims "[t]he tape drive of claim 18 wherein the controller determines the correction amount of tape at least in part by performing mathematical operations." '094 Patent, col. 32, ll. 34-36. Where dependent claim 30 limits the "correction amount of tape" to a mathematically calculated amount, one presumes that the "correction amount of tape" recited in independent claim 18 is not similarly restricted. See Philips, 415 F.3d at 1324-25; Liebel-Flarsheim, 358 F.3d at 910.

Although Markem correctly points out that the specification frequently discusses determining the "correction amount of tape" through "algorithms" or "mathematical processing," the claims do not require the "correction amount of tape" to be calculated, but instead anticipate additional methods of determining the "correction amount of tape." See Liebel-Flarsheim, 358 F.3d at 906 ("Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction") (internal quotation marks

and citations omitted). Id. In this case, Zipher has not demonstrated any intent to limit the "correction amount of tape" to a "calculated amount." Instead, the converse is true. The pertinent claims are specifically drafted to ensure that the "correction amount of tape" is not restricted to a calculated length of tape, and therefore I decline to import any such limitation into the claims. See id.

b. A Linear Length of Tape

Next, Markem maintains that the term "correction amount of tape" should be construed to mean a "linear length of tape," whereas Zipher avers that it also should be construed to cover "the tape associated with one or more steps of a stepper motor." I agree with Zipher that the term "correction amount of tape" includes the "tape associated with one or more steps of a stepper motor" and is not limited to a "linear length of tape."

As noted above, claim 18 of the '094 Patent, claim 1 of the '268 Patent, and claim 1 of the '917 Patent explain that the controller determines "a correction amount of tape to be added to or subtracted from tape extending between the tape spools in order to maintain tension in the tape . . . at an acceptable level." See, e.g., '094 Patent, col. 31, ll. 49-53. The

"amount of tape" that is "added or subtracted from tape extending between the tape spools" would necessarily be the "tape associated with one or more steps of the stepper motor" and I see no reason in the claims why the term should be limited to a "linear length of tape" as suggested by Markem. See id.

The dependent claims, which also use the term "correction amount of tape," indicate that the "correction amount of tape" includes both a "linear length of tape" as well as the "tape associated with one or more steps of a stepper motor." See Philips, 415 F.3d at 1314. Claim 26 of the '094 Patent, which is dependent upon claim 18, also uses the identical phrase "correction amount of tape." Claim 26 claims "[t]he tape drive of claim 18 wherein the correction amount of tape comprises one or more steps of the stepper motor." '094 Patent, col. 32, ll. 27-29. It would be inconsistent to conclude that the "correction amount of tape" recited in claim 18 does not include the tape associated with one or more steps of the stepper motor where dependent claim 26 clearly recites such a definition. See Fin Control Sys. Pty, Ltd. v. OAM, Inc., 265 F.3d 1311, 1318 (Fed. Cir. 2001) ("[T]he same terms appearing in different portions of the claims should be given the same meaning.");

Wright Med. Tech., 122 F.3d at 1445; Philips, 415 F.3d at 1314. Additionally, claim 25 of the '094 Patent, which depends on claim 18, claims "[t]he tape drive of claim 18 wherein the correction amount of tape comprises a linear length of tape." '094 Patent, col. 32, ll. 25-26. Where dependent claim 25 limits "the correction amount of tape" to a "linear length of tape," the doctrine of claim differentiation counsels against restricting the "correction amount of tape" recited in claim 18 to a "linear length of tape" as suggested by Markem.[10] See Philips, 415 F.3d at 1324-25; Liebel-Flarsheim, 358 F.3d at 910.

The specification also supports Zipher's construction that the "correction amount of tape" may be equated with the "tape associated with one or more steps of a stepper motor." The "correction amount of tape" recited in the claims is added or subtracted "in order to maintain tension in the tape extending between the tape spools. . . ." See, e.g., '094 Patent, col. 31, ll. 49-52. In detailing the tension control process, the

[10] Moreover, dependent claim 25 recites how the "correction amount of tape *comprises* a linear length of tape." '094 Patent, col. 32, ll. 25-26 (emphasis added). The use of the term "comprises" is well understood to mean "including but not limited to," indicating that the "correction amount of tape" is more than a simple linear length. See CIAS, Inc. v. Alliance Gaming Corp., 504 F.3d 1356, 1360 (Fed. Cir. 2007).

specification describes how the "amount of tape" added to the spools is equivalent to the steps of the stepper motor. For example, the specification describes how "a small step adjustment can be made to either or both of the motors to add [or remove] a short section of ribbon to the length of ribbon between the spools" in order to maintain the appropriate tension. '094 Patent, col. 21, ll. 57-59. In this way, the specification associates the "correction amount of tape" with the motor's step adjustments.

c. Must Restore Tape Tension

The parties also dispute as to whether the "correction amount of tape" is only intended to restore the tension to an acceptable level, or whether it necessarily must do so. I agree with Zipher that the "correction amount of tape" is designed to restore the tape tension to an acceptable level, but need not necessarily do so.

In this case, the language of the claims is clear and provides a definitive answer. Claim 18 of the '094 Patent and claim 1 of the '268 Patent each recite how the correction amount of tape is added or subtracted "in order to" or "so as to" maintain tension at an acceptable level. These qualifying

phrases clearly indicate that the "correction amount of tape" is designed to rectify the tape tension, but it need not necessarily do so.

2. "Controlling the Operation of Said Two Motors"

The parties next dispute the meaning of the term "controlling the operation of said two motors." Claim 2 of the '094 Patent and claim 1 of the '917 Patent disclose a tape drive with a controller "*controlling the operation of said two motors* to maintain the monitored tension at an acceptable level." See, e.g., '094 Patent, col. 28, ll. 48-50 (emphasis added). Zipher argues the term "controlling the operation" means "commanding or exercising direction over the operation of said two motors," while Markem urges me to construe the term to mean "rotating both motors." The differing interpretations ultimately center on whether "the operation of [the two] motors" is limited to rotating both spools, or whether "the operation of [the two] motors" includes the ability to hold their respective spool of tape against rotation. While neither party's construction is particularly persuasive, I agree with Zipher that "the operation" of the motors is not limited to rotation of the spools, but also includes the ability to hold a "spool of tape

steady against rotation."[11] See '094 Pateent, col. 31, ll. 36-67; '917 Patent, col. 27-28, ll. 66-23.

Claim 2 of the '094 Patent and claim 1 of the '917 Patent clearly disclose two "operations" the motors are capable of performing. See '094 Patent, col. 31, ll. 36-67; '917 Patent, col. 27-28, ll. 66-23. Claim 2 of the '094 Patent describes how the motors operate to rotate their respective spool of tape. See '094 Patent, col. 28, ll. 36-45 (reciting how "*each motor rotates* its respective spool of tape . . . with one of the motors being energized by pulses from the controller *to selectively rotate* its respective spool") (emphasis added). Id. Additionally, claim 1 of the '917 Patent describes how the motors may be operative to hold their spool steady against rotation. See '917 Patent, col. 27, ll. 66-67 (detailing how

[11] Zipher's proposed construction is nebulous and fails to define what "the operation" of the motors is, while Markem's proposed construction confuses the functions of the controller and the motor. The controller exercises "control" over the motors by directing the application of electrical power to each motor. See '094 patent, col. 28, ll. 27, 31-32, 41-43 ("a controller *controlling energization* of said two motors . . . with the controller (a) *energizing* both said motors so that each motor rotates its respective spool of tape . . . with one of the motors *being energized by pulses from the controller* to selectively rotate its respective spool . . . .") (emphasis added). The motors "operate" by rotating or holding steady their respective spool of tape. See '094 Patent, col. 31, ll. 36-67; '917 Patent, col. 27-28, ll. 66-23.

the controller "control[s] energization of each of the motors to selectively *rotate its respective spool* of tape . . . *or to selectively hold its respective spool* of tape steady against rotation") (emphasis added).

While the specification primarily associates the motor's "operation" with its rotation of the spools, the claims clearly contemplate each motor's ability to rotate and/or hold steady its respective spool of tape. See Liebel-Flarsheim, 358 F.3d at 913; Intervet Am., 887 F.2d at 1053. As a result, I agree with Zipher that the "operation of said two motors" is not limited to rotating the spools. I construe the term "controlling the operation of said two motors" to mean "controlling the motors to rotate or hold their respective spool of tape against rotation."

3. "Parameter Indicative Of"

Finally the parties dispute the meaning of the term "parameter indicative of." Claim 1 of the '268 Patent and claim 1 of the '917 Patent claim a "monitor monitoring a *parameter indicative of* tension in the tape extending between the spools." '268 Patent, col. 27, 64-65; '917 Patent, col. 28, ll. 13-14 (emphasis added). Additionally, claims 1 and 12 of the '605 Patent claim "a monitor monitoring a *parameter indicative of* the

diameter of at least one of the spools of tape." '605 Patent, col. 28, ll. 12-13; col. 29, ll. 39-40 (emphasis added). Markem contends that the phrase should be construed to mean "an indirect measurement used to calculate tension or the diameter of a spool." Zipher maintains that the term means "a physical property representing or relating to." Ultimately the disagreement centers on whether the term "indicative of" claims both direct and indirect methods of measurement.[12]

The language of the claims does not persuasively establish that the term "parameter indicative of" is limited to indirect measurements as Markem contends. A measurement may "indicate" or "point out" the tension in the tape or the diameter of the spools whether it is obtained directly or indirectly. See Oxford English Dictionary (2d ed. 1989), available at http://www.oed.com (defining "indicative" as something which "points out, states, or declares").

While the specification does not use the phrase "parameter

[12] Markem's construction would also require the "parameter indicative of" be "used to calculate" tape tension or the spool diameter. The claim terms do not include this limitation and Markem did not make any attempt in its briefing to explain why I should incorporate such a limitation. As a result, I decline to do so.

indicative of,"[13] it does detail the methods of monitoring tape tension and spool diameter, disclosing both direct and indirect methods. With respect to the monitoring of tape tension, the specification only discloses what may be considered "indirect" methods of monitoring tension. For example, the specification discloses how the tension in the tape extending between the spools is monitored by conducting alternative measurements such as the "measures of power supplied to the two motors, measures of the spool radii, [and] calibration factors for the two motors. . . . " '094 Patent, col. 5, ll. 34-36; see also '094 Patent, col. 5, ll. 15-19; col. 24, ll. 61-66. With respect to spool diameter, however, the specification recites how the diameter is "directly monitored" or "directly measured." See '094 Patent, col. 5, ll. 27-29 ("[t]he outside diameters of the tape spool may be directly monitored"); col. 24, ll. 55-56 ("[i]n general however it is to be preferred to directly measure the spool diameters").

The phrase "monitoring a parameter indicative of," should be construed consistently when it is used with respect to both tape tension and spool diameter. See NTP, Inc. v. Research in

[13] The term "parameter" is used once in the context of monitoring tape tension. '094 Patent, col. 24, l. 66.

Motion, LTD., 418 F.3d 1282, 1293 (Fed. Cir. 2005) (noting that because a group of patents "all derive from the same parent application and share many common terms, we must interpret the claims consistently across all asserted patents"); '917 Patent, col. 28, ll. 13-14; '605 Patent, col. 28, ll. 12-13. Because Markem's interpretation would read out a preferred embodiment as it relates to the monitoring of tape diameter, I decline to accept its interpretation. The term "parameter indicative of" includes both direct and indirect methods of monitoring.

III. CONCLUSION

For the foregoing reasons I decline to treat the claims using the terms "controller" and "monitor" as means-plus-function claims. Additionally, I construe the term "correction amount of tape . . ." to mean an "amount of tape, including a linear length of tape, or the tape associated with one or more steps of the one or more steps of the stepper motor." I construe the "the operation of said two motors" to include "rotating or holding steady its respective spool of tape against rotation." Finally, I construe the phrase "parameter indicative of" to cover both direct and indirect methods of monitoring tape

tension and spool diameter.

SO ORDERED.

/s/Paul Barbadoro
Paul Barbadoro
United States District Judge

November 21, 2011

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